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Abstract

Research into the use of social media for academic purposes is increasingly emerging. Such research suggests that a social networking site (SNS) could be used as an innovative tool for teaching purposes. However, much of previous research has focused on outlining the experience of students and the empirical evidence to date reports how a SNS may develop a higher level of academic engagement amongst students. In addition, research in this field has overlooked review of the pedagogy involved in utilising a SNS for education purposes successfully. Previously, Koehler and Mishra (2009) proposed the TPACK framework to explore the relationship of technology in teaching which builds the basis for this research. This paper explores the suitability of the TPACK framework in the context of utilising SNSs and reviews its relevance to the adoption of a SNS as a teaching tool. Initial observations suggests that the current TPACK framework overlooks some important elements which are relevant to the adoption of SNS.

Keywords: TPACK, eLearning, Higher Education, Social Networking, Facebook

1.0 INTRODUCTION

There is an increase in the interest and available academic literature on the use of social networks, e.g. Facebook, Twitter or Xing more generally in education. The social network Facebook has over 1.15 billion monthly active users (Statistics Brain, 2014) and was initially created for university students. Though the use of a SNS, such as Facebook, for academic purposes can be viewed by some academics cautiously, other academics perceive that such tools may allow for the investigation and cooperation of answers, opportunities and solutions to problems during the course of the modules online (Duncan and Baryzck, 2013). This paper reviews how the social networking site, Facebook, is used as a pedagogical tool for student academic engagement. The TPACK framework is a heuristic for exploring the elements required for effective teaching with technology. This framework provides a useful heuristic. The data presented also demonstrates there are some limitations in the TPACK framework. This research suggests that the framework inherently undervalues the human experience in the exchange of knowledge, particularly under-representing the role of the lecturer and their insights into student dynamic and student profile and its influence of technological use.

2. LITERATURE REVIEW

2.1 Social Networking Sites as Academic Tools: The Case of Facebook

Harris (2012) has suggested that the literature on Facebook in education can be organised into two key categories: first the literature which is most pre-2010 which focuses on the experience of education student life from a marketing, communication and student experience perspective; second is the literature which looks at Facebook as an academic tool used for teaching and

learning activities and is mostly available post-2009. It should be acknowledged that using Facebook for academic purposes was never the original intention of this specific SNS. The site was built for social purposes and later adopted as a possible academic tool in some institutions. To date much of the second category of literature has focused on the learner and their learning within the social networking site, rather than exploring the teacher and the teaching (Harris, 2012). This paper suggests that there is a third category emerging more recently which looks at the pedagogic considerations of utilising the social networking site at third level.

Research by O'Brien and Glowatz (2013) also suggests that Facebook, when used as an academic tool, promoted student engagement beyond just information-sharing. This work provided a minor insight into post-experience, postgraduate usage of SNSs. As part of this study, students demonstrated high levels of student collaboration and academic discussion, which ultimately generated theoretical innovation with the module concepts which may not have occurred in the traditional classroom environment. Having looked at some of the considerations regarding student academic engagement with such SNSs and given the increasing interest in the use of social networking sites for academic purposes, this paper will now review the TPACK framework and discuss some of the considerations of teaching with a SNS, using the TPACK Framework.

2.2 The TPACK Framework
The TPACK Framework allows for exploration of Facebook from a pedagogic perspective. TPACK stands for '**Technology, Pedagogy and Content Knowledge Framework'.** The TPACK framework was introduced as a framework to allow teachers and researchers to conceptualise the knowledge base for lecturers to teach effectively with technology (Sculman, 1987). In the research to date, different terms have been used to refer to the instructor; some use the term lecturer and others refer to the teacher. Many of the articles from the US tend to refer to the 'teacher' (Schulman, 1986; 1987). For this paper, which looks at TPACK in the context of Irish higher education, the term 'lecturer' is more commonplace. As a result, the term lecturer will be use ubiquitously through this paper to capture the terms of teacher, instructor and lecturer.

Koehler and Mishra (2009) outline that traditional teaching technologies, e.g. a tool as simple as a pencil, tend to have characteristics such as specificity, stability, and transparency of function. By contrast, digital technologies tend to be usable in many different ways and are unstable and opaque i.e. the mechanics of the technology are not visible to users. Thus, because of the characteristics of digital technologies, they present clear challenges from a teaching perspective. For example, in the case of Facebook some of the challenges might include the perception of Facebook as a social tool, the reluctance of institutions to use it for academic purposes or the digital privacy issues of using a social tool for academic purposes. The framework outlines a complex interaction between three areas of knowledge: content, pedagogy and technology which produces the category of flexible knowledge required to integrate technology into teaching. As to date the construct has only looked at

technology in more general terms, this paper review the framework in the context of the use of a social networking site.

The central elements of good teaching with technology according to TPACK include content, pedagogy and technology, and only the interplay between these three domains can generate the type of flexible knowledge which is needed to successfully incorporate technology into teaching. Koehler and Mishra (2009) acknowledge the teaching is a complex phenomenon and often a teacher has to practice 'their craft' in a very dynamic environment which requires them to constantly develop their own understanding. A newer technology may be obscure and unstable itself. It may present new challenges to those who attempt to use technology more in their teaching. An example in the context of this study could be the use of the SNS, Facebook and the areas of ethics and privacy, which it requires. In addition to the complexities of the technology, context and social factors may also affect the relationship between technology, e.g. the educational institutions themselves may not be supportive of an individual's efforts to use technology. Thus, the task of integrating technology into teaching can be complex and difficult. Mishra and Koehler (2009) highlight while that there is no 'one best way' to incorporate the use of technology into the learning environment; three central components are central to its success; content, pedagogy and technology. They suggest that the interaction between these three areas account for the diversity experienced in the quality and scope of technology integrated into teaching. Building on Shulman's work [1986; 1987], the TPACK framework may capture how a lecturer's knowledge of educational technology and how the domains of content and pedagogy knowledge interact with technology knowledge. As important as these three components are, so too are the relationships between these three bodies of knowledge which are PCK, TCK (technological content knowledge), TPK (technology pedagogical knowledge) and TPACK (Figure 1).
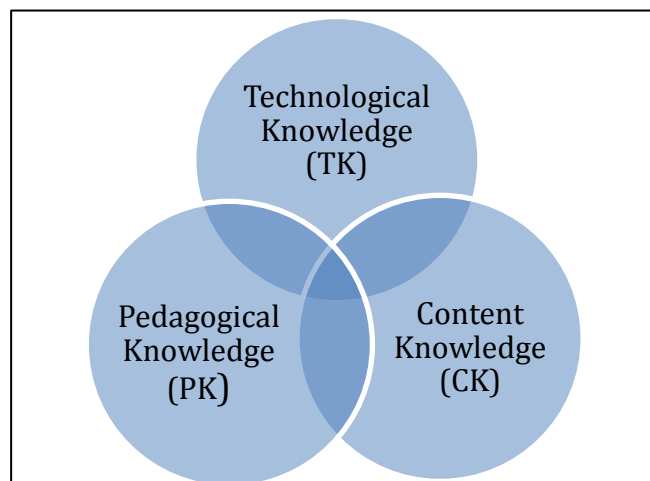

Figure1: The TPACK Framework and its knowledge components

2.3 TPACK Framework Components
There are seven constituents components of the TPACK Framework and each will be briefly alluded to now. **Content knowledge (CK)** relates to the

lecturer knowledge regarding the material to be taught or learnt. A lecturer needs to have in depth content knowledge of the concepts, theories, evidence, practices and approaches which might develop a student's content knowledge of the material. In this case study, the content knowledge was pertaining to the discipline of Management Information Systems.

Pedagogical Knowledge (PK) provides insight into the lecturer's knowledge about the methods or practices of teaching and learning, including educational values, rationales and intents. It also includes awareness of how students learn, are assessed, how content knowledge is best communicated, etc. According to Koehler and Mishra (2009).

Technology Knowledge (TK) is the most dynamic element of the framework as the definition of a particular technological tool can be outdated by the time it is researched or discussed. TK is never an 'end state' (2009:74) regarding how to master a technology but instead it is all the time advancing as the individual interacts with technology. In the case of this study, the technology used was the SNS Facebook.

Pedagogical Content Knowledge refers to lecturer's unique knowledge of the subject matter which they interpret and present the material to students using their insight into the student's needs, the curriculum, assessment required, etc. It requires the ability to demonstrate the relationships between the different discipline ideas, pedagogic strategies, students' prior knowledge, etc.

Technological Content Knowledge (TCK) demonstrates how technology and content knowledge have a close relationship as technology changes are often associated with new understandings of the world. Koehler and Mishra (2009) give the example of how a digital computer advanced understanding of mathematics and physics and led to a fundamental change in the nature of this field. An appreciation of the impact of technology on practices and knowledge of a particular subject area is fundamental to advancing appropriate technological tools for educational reasons. Lecturers require some appreciation of the specific technological tools which are available and best suited to address the subject-matter learning in their field and how this technology might change the content of their discipline or vice versa. Another example of relevance to this study might be the use of 'Facebook' to demonstrate how social networking might operate in the business environment for marketing purposes.

Technological Pedagogical Knowledge demonstrates how an understanding of learning and teaching can alter when a specific technology is utilised in a certain fashion, including knowledge of how the quality of the teaching object or environment relates to the module and the ability to develop suitable pedagogical strategies and designs to develop student learning.

Finally, **Technology, Pedagogy and Content Knowledge (TPACK)** is an 'emergent form of knowledge' which pervades beyond all three key constituents (2009). TPAC knowledge emerges from the dynamic between

pedagogy, technology and content knowledge and yet, it is an unique type of knowledge which this the basis of effective teaching with technology, demands an appreciation of the representation of concepts using technology; pedagogic tools which utilise technology to teach content; knowledge which present concepts to students as tangible or challenges and how technology can overcome some of these challenges; knowledge of students' previous knowledge and theories of epistemology; and also the knowledge of how technologies drawn upon this knowledge to develop new ways of understanding. Koehler and Mishra (2009) acknowledge that there is no single correct amalgamation of how these elements should be utilised. The lecturer is best placed to respond to the demands of the three elements in accordance with the learning environment and students. Thus, they require the skills to adapt and respond to the fields of technology, content and pedagogy (T, C and P) and the areas of interplay between them (PCK, TPK, TCK and TPACK).

2.4 Implications of TPACK

The TPACK framework is one which lends itself to the investigation of the knowledge basis of an academic in utilising a SNS for teaching purposes. It acknowledges a number of the key variables and allows for the flexible combination of them depending on the dynamic of the learning environment. An inherent strength of the framework is its ability to review technology not simply as an 'add-on' but to focus on the connections between the three domains of content, technology and pedagogy in the learning environment (2009). While the framework helps conceptually with the knowledge base required by lecturers, it does appear to misrepresent the human interaction required in this knowledge transfer. There might be three elements to this misrepresentation; first the lecturer's accumulated knowledge of their practice of teaching which they bring to the learning experience: second the centrality of the learner and understanding in the experience of being taught with technology: third the lecturer's proficiency with the technology is central to the use of using technology, particularly a SNS, to enhance the quality of the education experience. Each of these elements is briefly discussed from a theoretical perspective before the results of this study are reviewed.

First, in a review of the TPACK framework, Voogt, et al. (2013) completed a systematic literature review of 55 peer-reviewed journal articles and one book chapter which were published between 2005 and 2011 in order to explore the theoretical and practical uses of TPACK. They note the value of the TPACK framework is that technology is acknowledged to support students in learning the conceptual and procedural aspects of a particular subject domain. Voogt, et al. (2013) suggests that it is important to understand how the technological reasoning affects the academics decisions when using technology. Equally, they suggest that lecturers need to be show what benefit technology is for their subject for improving the teaching and learning environment.

Second, the current framework does not sufficiently account for the lecturer knowledge of student's cultural backgrounds, their knowledge of student profile and demographics of different student cohorts, insight into the students' familiarity with the technology to be utilised or the cultural variances

which may exist within a cohort in utilising technology in the teaching environment. Such a dimension extends beyond the idea of pedagogic knowledge or its related areas of pedagogic content knowledge or pedagogic technological knowledge. This critique, perhaps, is indicative of a deeper concern regarding the centrality of the student to the learning process as outlined in the current TPACK framework. The model currently focuses on knowledge and the transfer of knowledge, rather than the learning experience of the student. The research below demonstrates the importance of the lecturer's understanding of the students' profile, as well as the lecturer's own 'Craft Knowledge' and 'Technological Knowledge', in order to successfully use technology in the learning experience.

This need for 'Craft Knowledge', Technological Knowledge and technological proficiency raises the third issue with the current TPACK framework. The authors wish to explore that an academic needs to be proficient with the technological knowledge and be perceived by the students as an expert with the technological tool. Students' expectations of their lecturers and the use of technology in their teaching have changed. Central to this improved and more engaging experience is an expectation for lecturers to have a high level of Technological Knowledge. Drawing on above literature review, the authors formulated the following hypotheses:

H1   Today's student cohort expects a high level academic's TK for effective and efficient knowledge transfer

H2   Students perceive innovative SNS initiatives as suitable tools for effective and efficient learning

3 METHODOLOGY

A case study design methodology was selected for this research project as it allowed for an in-depth study of this phenomenon and encouraged the use of multiple data collection tools (Yin, 2009). Using online survey instruments, Qualtrics and SurveryMonkey, the authors designed an online questionnaire as the primary data collection tool for this study. Three surveys were distributed to the following selected student cohorts during the academic year 2013/2014 at UCD's School of Business (Table 1).

Student Group	Module Title	Size	SNS Use
MSc in Business	ICT Project Management	52	Closed Facebook group
MSc in Management	Business Information Systems Management	99	Closed Facebook group
Bachelor of Commerce	Emarketing & Social Networking	192	Facebook Fan page

Table 1: Data Set

In each case, students were circulated with an online survey and had a two week period (Monday, 24th March 2014 until Sunday, 6th April 2014) to respond anonymously. 83 responses were returned, yielding a response of 34% (83/243). Identical questions examining the use of Facebook in higher education and the students' experience of it were administrated. Questions

were a mix of open-ended, closed-ended and rating scale (which used a modified Likert scale). A copy of the survey is included in Appendix One. Qualtrics (http://qualtrics.com/), the survey instruments, was used to distribute the survey online as it was convenient and used for other programme evaluations so the students were familiar with it. Content analysis and statistics using Qualtrics sofyware was used to analyse the data sets. Descriptive statistics were used to summarise the survey's quantitative data.

4. TENTATIVE RESEARCH FINDINGS
H1 Today's student cohort expects a high level academic's TK for effective and efficient knowledge transfer.

This paper also explored the extent of student expectation regarding the Technological Knowledge of the lecturer. Students' own usage of Social Networking Sites is quite high. Please see the responses to Table 2 of the survey below. Students are regular users of a variety of Social Network Sites themselves. In particular Facebook was the most utilised SNS of this student cohort. 'Whatsapp' and 'Google+' were also popular social media applications which students cited use of under the 'Other' option.

Question	Daily	Weekly	Less than weekly	Never
Facebook	32%	0%	0%	0%
YouTube	61%	25%	6%	1%
LinkedIn	19%	24%	27%	19%
Twitter	18%	22%	17%	31%
Instagram	17%	12%	12%	46%
Other	8%	1%	2%	12%

Table 2 Student SNS usage

Given the high rate of student usage and their familiarity with such these technologies, there appeared to be an expectation that lecturers would be as proficient as students with the resources. Some students eluded to a lower technological proficiency amongst teaching staff and appeared to experience some disappointment when experiencing this on various modules, as outlined by the representative student comments below:

> "Lecturers may not be able to understand our most effective learning habits. Also, it is slightly annoying when the lecturer is fumbling with the technology in class."(Respondent 22 to Question 27)
> "We are used to our attention being grabbed by various different media, giving new and interesting angles on old discussions/topics so when different forms of technology aren't used to effectively express the point that is being made it is hard to pay attention. Social media/technology has increased my engagement with topics so when it isn't there I find there is some detachment" (Respondent 24 to Question 27).

The majority of students perceived an academic's lack of technological knowledge as a negative impact on the student's own learning, as outlined in Table 3 below:

In your opinion, do you think a lecturer's possible lack of technological knowledge (i.e. the lecturer NOT utilising innovative ICT and Social Media as part of the module delivery) has a NEGATIVE impact on your learning experience? (Question 26)

Answer	%
Yes	64%
No	36%
Total	100%

Table 3: Impact of Lecturer's Level of Technological Knowledge on Perceived Student Learning

Not only was a case that students may expect lecturers to draw upon social media, it was seen to be possibly linked to the credibility of the teaching delivered. Some students spoke about a loss of 'legitimacy' of how an academic is perceived amongst the students. This observation seems to be particular valid in relation to modules which teach technology or business information systems management. When asked a technology knowledge gap affected their learning, a number of students suggested that it was important that staff are seen to be abreast of new technologies and that it has implications for their teaching credibility:

> *"Because the lecturer loses all legitimacy in front of his students.....It is all related, so if a lecturer does not use the technology (practical) as they are explaining the theory of it, it is hard to appreciate the theory the lecturer is teaching you." (Respondent 30 to Question 27).*
> *"I believe that it may have negative impact if a lecturer does not understand the relevance of new media or means of communication. It can damage the reputation and rapport of a lecturer when he/she is giving a class, and thus lose their interest/respect for the rest of the semester" (Respondent 29 to Question 20).*

Where a lecturer does engage with the technology, it appears to positively endorse the lecturer's credibility, as indicated by the following question:

> *"Makes me feel more comfortable with this module, gives it legitimacy. Gives the teacher an image of someone that wants to be close to his students, and thus it is motivating." (Respondent 29 to Question 20).*

5. DISCUSSION

This paper set out to address two key questions:

1) Does the TPACK framework provide an insight into the knowledge base required to effectively deliver a module utilizing innovative SNS?

2) How might the TPACK framework be adapted to best reflect the experience of both lecturer and student?

The TPACK framework does provide into the many complexities of the knowledge base which lecturers use to deliver a module using a SNS. The TPACK framework is a useful conceptual took to investigate the dynamics of the module in the case study here. It acknowledges a number of the key variables and combines them in light of dynamic of the learning environment. However, as outlined, there are potentially three elements to this misrepresentation; first the lecturer's accumulated knowledge of their practice of teaching which they bring to the learning experience: second the centrality of the learner and understanding in the experience of being taught with technology: third the lecturer's proficiency with the technology is central to the use of using technology, particularly a SNS, to enhance the quality of the education experience. The data here suggests a number of key observations:

- First a lecturer needs to understand the students' prior knowledge and their current familiarity with technology. This observation supports the TPACK framework itself. Students appreciated where the lecturer had a technological knowledge of a SNS in this instance. A lecturer ability to gauge their students level of engagement and familiarity with technology enhanced the student's experience and their perceived learning. Students appeared to experience frustration where teaching staff were not in tune with students' familiarity with technology. This in turn detracyed from the legitimacy of teaching staff.
- Second, the importance of lecturer's craft knowledge when using new technologies needs to be acknowledged. This is overlooked by the current TPACK framework. The approach of an individual to their teaching, including the knowledge which underpins their pedagogy, their depth of knowledge of subject matter, students and curriculum, and even practice and the belief system which lecturers holds appears to directly impact on a student's perceived learning. As one student stated

> *"It is all related, so if a lecturer does not use the technology (practical) as they are explaining the theory of it, it is hard to appreciate the theory the lecturer is teaching you."*

- Third the positive engagement with technology of a lecturer impacts upon their credibility with students. In addition to students appearing to have a positive experience of using a Social Networking Site, it appears to impact directly on the students perception of the academic also.

The second objective of this paper to address was 'How might the TPACK framework be adapted to best reflect the experience of both lecturer and student?'. The TPACK framework (Koehler and Mishra, 2009) is indeed a useful heuristic to explore the knowledge base for lecturers to teach with technology. It provides a means to explore by to understand the complex dynamic of the learning environment. It, however, requires further exploration to explore the 'craft knowledge' of lecturers and the means by which they effectively combine the disparate elements of the learning experience to create a positive learning environment. In addition to the three key

observations outlined above, there is some concern regarding the omission of the student within the TPACK framework.

6. CONCLUSION AND FUTURE RESEARCH

While the existing TPACK framework has been a proven tool being very useful, it is unfortunate the student dimension is not graphically incorporated into the figure to underpin the importance of the student in this environment. In conclusion, further empirical work is required to further understand this complex exchange between student and staff in the digital environment. As technology continues to be of increasing importance to the learning environment, the TPACK framework is likely to become of greater importance.

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